

# Introduction to Dermoscopy

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# Introduction to Dermoscopy

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## Disclosure

- Dr. Deborah Bren has no conflict of interest, financial agreement, or working affiliation with any group or organization.

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## Introduction

**Deborah A. Bren, DO**  
Family Physician  
Lehigh Valley Physician Group  
USF Assistant Professor FM  
FM Resident Preceptor, LVPG  
Philadelphia College of Osteopathic  
Medicine 1984

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It's a very ancient saying,  
But a true and honest thought,  
That if you become a teacher,  
By your pupils you'll be taught

*The King and I, "Getting to Know You"*  
By Rodgers & Hammerstein

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Bar Harbor, Maine

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## American Dermoscopy Meeting

### ■ Faculty

- ◆ Ashfaq A. Marghoob, MD
- ◆ Ralph Braun, MD
- ◆ Natalia Jaimes, MD
- ◆ Michael Marchetti, MD
- ◆ George Martin, MD
- ◆ Steven O'Day, MD
- ◆ Margaret Oliviero, ARNP, MSN
- ◆ Harold Rabinovitz, MD
- ◆ Richard Usatine, MD

### ■ Each summer in a National Park

### ■ Course Content:

- ◆ Fundamentals
- ◆ Pearls
- ◆ Interactive

<http://www.americandermoscopy.com/>

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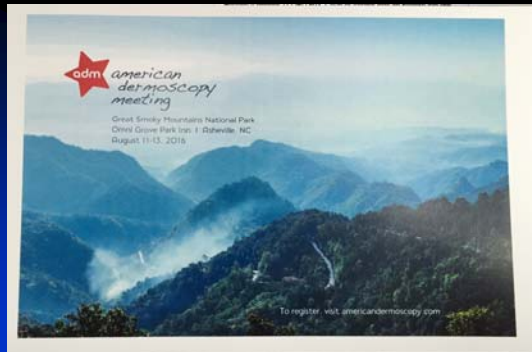
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## Why Should I Learn About Dermoscopy?

- If you like to do procedures!
- If you think about how much and how often we see skin!
- Long wait times for pt's to get into dermatology, shorter if you have a biopsy result
  - ◆ Patients may have complained about dermatologists once or twice?

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## Memorial Sloan-Kettering Cancer Center

- Dermoscopy workshop
- Yearly, each fall in NYC

<http://www.mskcc.org/events/>

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## American Academy of Family Physicians

- Yearly fall scientific assembly
- Dermoscopy workshops
- <http://www.aafp.org/events/assembly.html>

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## AAFP

- Sponsors a course
- Skin Problems and Diseases
- Includes a Dermoscopy workshop
- <http://www.aafp.org/cme/>

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## American Academy of Dermatology

- Many lectures and workshops at it's national meetings
- [www.aad.org](http://www.aad.org)

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## Dermoscopy On-Line

- <http://www.dermoscopy.org/>
  - ◆ Website from Italy
  - ◆ Includes free dermoscopy tutorial

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## International Dermoscopy Society

- <http://www.dermoscopy-ids.org/>

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## Atlas of Dermoscopy

Second Edition



Edited by  
Ashfaq A. Marghoob  
Josep Malvehy  
Ralph P. Braun

informa  
healthcare

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## Dermoscopy Apps

- Dermoscopy Two Step Algorithm
- Usatine Media
- Richard Usatine, MD
- Co-sponsored by DermLite
- Free on iTunes and Android store

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## Let's get started



Photo Credit: Kevin Wynosky

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## What is a Dermoscope?

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Handheld instrument w/ magnifying lens and a light source that removes surface glare + allows us to see structures that are not visible to the naked eye.

Often has a polarized and nonpolarized option.

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Phone +1-949-481-6384  
Fax 949-240-7692  
dermlite.com

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## Why Use a Dermoscope?

- Stethoscope for the skin
- Like a using a Fundoscope for examining the eye
- Dermatologists say that performing a skin inspection w/o a dermoscope is like listening to someone's lungs w/o a stethoscope.

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## Old "ABCD" Method

- Asymmetry
- Borders (irregular)
- Color (variation)
- Diameter ( > 6mm)

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## Using Technology

- Total Body Photography
  - ◆ Comparative + Differential recognition
  - ◆ ABCDE
- Dermoscopy
  - ◆ Analytical recognition
  - ◆ Differential recognition
  - ◆ Comparative recognition
  - ◆ Gives microscopic morphology
- Confocal Microscope
  - ◆ Analytical recognition
  - ◆ Akin to an ultrasound of skin
  - ◆ Gives fuzzy-cellular morphology
- Histopathology
  - ◆ Gives cellular morphology

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## Confocal microscope



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## More of the Why

- Aids in early detection of skin cancers
  - ◆ Melanoma
  - ◆ BCC
  - ◆ SCC
- Early Detection
  - ◆ Decreases
    - Mortality
    - Morbidity
    - Healthcare Costs
- Non-invasive technique based on pattern recognition
- Increases our sensitivity & specificity

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## More of the Why

- Helps to determine where to biopsy
- Helps to discern if Malignant Melanoma is present
- Minimizes the frequency of removing benign lesions
- Maximizes our diagnostic accuracy
- Manages patient's angst

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## Benign to Malignant Ratio

- Improved diagnostic accuracy after a 1-2 year "learning period"
- In one study:
  - ◆ Baseline: 13.75
  - ◆ Dermoscopy Year 1: 22.5
  - ◆ Dermoscopy Year 2: 7.86

Source: Terushkin V, et al. (2011) Arch Dermatol 146(3):343-344

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## Specificity & Sensitivity

- If you only examine lesions that clinically concern you, then dermoscopy only improves your **specificity**.
- If you examine lesions that do not clinically concern you, dermoscopy will improve your **sensitivity**

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## Dermoscopy in General Dermatology

- Classic: tumors and nevi
- Hair Disorders (Trichoscopy)
- Infections and Infestations (Entomodermoscopy)
- Inflammatory (Inflammoscopy)
- Nail fold capillaries (Capillaroscopy)
- Treatment

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## Infections & Infestations

- Tinea Nigra
- Molluscum contagiosum
- Warts (general and genital)
- Scabies (burrows and mites)
- Lice
- Use a glass slide, baggie, or disposable covers now available to protect device and pts

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## Scabies



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## Inflammoscopy

- Psoriasis
- Dermatitis
- Lichen Planus
- Pityriasis rosea
- Discoid Lupus Erythematosus

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## Hair Disorders

- Non-Scarring Alopecias
- Scarring Alopecias

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## Types of Dermoscopy

- Non – polarized (Conventional)
- Polarized non contact
- Polarized contact

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## Non-Polarized Dermoscopy

- Contact + Liquid interface
- Superficial layers
- Comedo like openings will be more conspicuous
- Milia - like cysts visible only with NPD
- Superficial blue-White Veils  
(due to orthokeratosis)

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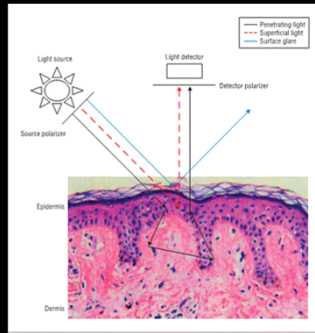
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## Polarized Dermoscopy



Source: Polarized and Nonpolarized Dermoscopy  
The Explanation for Observed Differences  
Yan Pan, BMedSc, et al  
Arch Dermatol. 2008; 144(8):828-829

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## Polarized Dermoscopy

- Contact or non-contact
- Deep layers of epidermis and papillary dermis
  - ◆ White color more conspicuous
  - ◆ Pink and red colors more conspicuous
  - ◆ Blue-gray ovoid nests/globules
  - ◆ Granularity
  - ◆ Crystalline structures

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### Non-Polarized Contact

- Superficial structures
- (Like milium-like cysts in SK's)
- Blue-White Veil is more conspicuous
- Steel-blue color in blue nevus will be more homogenous

### Polarized Non-contact

- Deeper layers + vasculature
- More vascular blush
- White shiny areas
- (crystalline lines in melanoma + rosettes in SCC)

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## The Blink Sign

- Toggling between Polarized and Non Polarized light source
- Highlights specific structures due to differences in depths imaged
- Unveils crystalline structures

Article by Ralph Braun, MD, et al in Arch Dermatol 2011;147:520

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## Contact Dermoscopy

- Alcohol
- Gel
  - ◆ Preferred for nail evaluation
- Water
- Mineral oil
- Hand sanitizer
- Take care not to press too hard!

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Segovia, Spain

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## Take Pictures of Your Images!

- Connection kits for iPhones, iPads, etc.
- Before biopsy or excision
- Confirm diagnosis after path report received
- Accelerates learning
- Up-load them

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## Take Pictures of Your Images!



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## Usatine's Tips for Storage and Retrieval

- Label photo with name of diagnosis
- Picasa = free program from Google
- Don't use patient names or MRN's on files
- Find photo by date

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## Pattern Recognition



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## Two Step Algorithm:

Differentiating melanocytic from  
nonmelanocytic lesions

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## Analytical Analysis

- Presence or absence of specific colors and structures
- Structure morphology
  - ◆ Typical/regular vs atypical/irregular
- Color and structure distribution

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Step sectioning  
< 2% of the lesion is evaluated



Source: imgarcade.com

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## Dermoscopy Colors

- Melanin
  - ◆ Main chromophore in pigmented skin lesions
  - ◆ Depends on anatomic location and concentration in the skin
    - Will range from black to blue, even gray
    - Can be Light brown to dark brown
- Hemoglobin
  - ◆ Red blood cells
  - ◆ Pink to red colors
- Collagen Fibers
  - ◆ Found in dermis
  - ◆ White in color

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## Dermoscopy Structures

- Pigment network
  - ◆ Reticulation
    - ★ Grid-like or honeycomb pattern consisting of intersecting pigmented lines and hypopigmented holes
  - ◆ Typical
    - ★ With few exceptions = Nevi
  - ◆ Atypical
    - ★ Melanoma and dysplastic nevi

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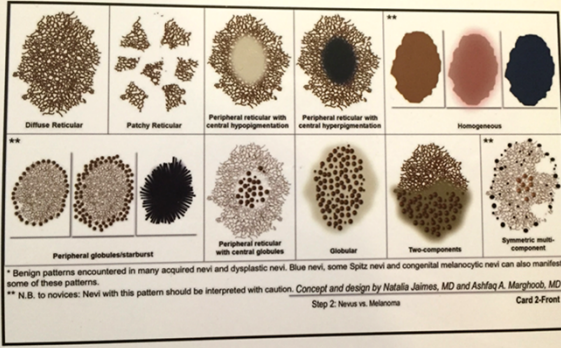
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### Benign Nevi Patterns



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### Melanoma Specific Structures

	OR
Atypical network, including angulated lines	1.1 - 9
Negative pigment network	1.8
Streaks (pseudopods & radial streaming)	1.6 - 5.8
Atypical dots and/or globules	2.9 - 4.8
Off-centered blotch	4.1 - 4.9
Peripheral tan structureless areas	2.8 - 2.9
Blue-white veil overlying raised areas	2.5 - 13
Regression structures • Blue-white veil overlying macular areas, scar-like areas and/or peeping	3.1 - 18.3
Atypical vascular structures • Dotted, serpentine, corkscrew, and polymorphous vessels (>1 morphology), milium-red areas, red globules	1.5 - 7.4
Shiny white lines (Crystalline structures)	9.7

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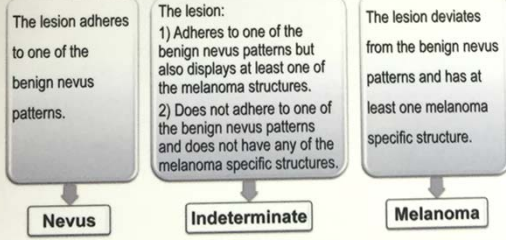
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## Evaluating Melanocytic Lesions With Dermoscopy:



Concept and design by Natalia Jaimes, MD and Ashfaq A. Marghoob, MD  
Step 2: Nevus vs. Melanoma      Card 2-Back

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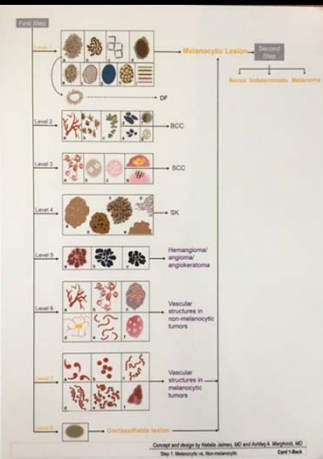
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Concept and design by Natalia Jaimes, MD and Ashfaq A. Marghoob, MD  
Step 1: Melanocytic Lesions

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## Pigment network



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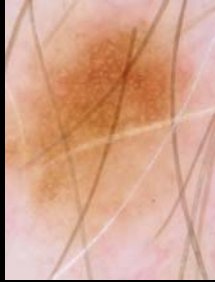
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## Pigment network



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## Dermoscopy Structures

- Pseudonetwork
  - ◆ Can be found in melanocytic and non-melanocytic pigmented lesions of the face

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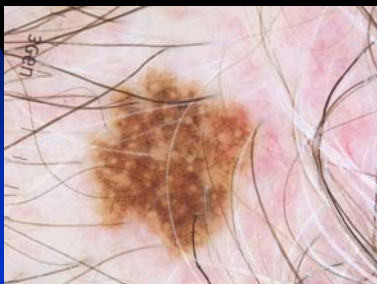
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## Pseudonetwork



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## Dermoscopy Structures

- Structureless Areas
  - ◆ Usually hypopigmented compared with surrounding lesion but not in comparison to surrounding normal skin
  - ◆ In nevi
    - ✦ found within the nevus
  - ◆ In melanoma,
    - ✦ Usually found at periphery of lesion

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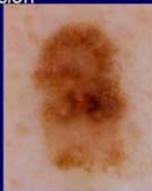
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### Tan to brown structureless areas

#### Typical

Brown structureless area towards center of lesion



#### Atypical

Brown structureless area(s) at periphery of lesion



Source: [ida.dermoscopy-ida.org](http://ida.dermoscopy-ida.org)

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## Dermoscopy Structures

- Blotches
  - ◆ Dark brown to black
  - ◆ Usually homogenous
  - ◆ Obscures visualization of underlying structures
- Nevi
  - ◆ Homogenous and central
- Melanoma
  - ◆ Heterogenous, multiple hues
  - ◆ Located off center

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### Structureless area vs Blotch

A **BLOTCH** is a hyperpigmented structureless area occupying at least 10% of the surface area



A **STRUCTURELESS AREA** is a hypopigmented area devoid of any dermoscopic structures and occupying at least 10% of the surface area



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[uda.dermoscopy-ids.org](http://uda.dermoscopy-ids.org)

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### Dermoscopy Structures

- Dots
  - ◆ < 0.1mm in diameter
  - ◆ Black, brown, gray, bluish
  - ◆ Nevi
    - ✦ Located toward center of lesion
    - ✦ Can overlie the network lines
  - ◆ Melanoma
    - ✦ not associated with network
    - ✦ Located in periphery of lesion

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### Dermoscopy Structures

- Peppering/Granularity
- Blue-White Veil over flat areas
  - ◆ Tiny blue-gray granules
  - ◆ Can be a sign of regression
  - ◆ Can be seen in melanocytic and non-melanocytic lesions
- ◆ Nevi
  - ✦ Area usually < 10% of whole surface area
- ◆ Melanoma
  - ✦ Area tends to encompass > 50% of the surface area

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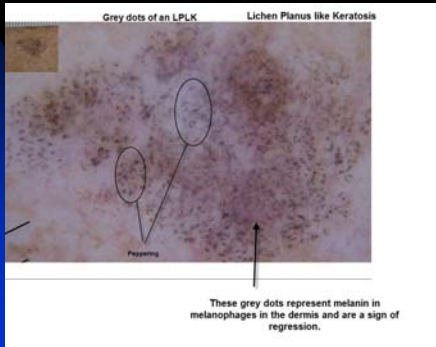
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## Dots and Peppering



Source: Dermoscopy.madesimple.blogspot.com.au

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## Dermoscopy Structures

- Globules
  - ◆ > 0.1mm; round to oval structures
  - ◆ Brown, black, blue-gray or red
- ◆ Nevi
  - ✦ Similar size, shape and color
  - ✦ Symmetric distribution
- ◆ Melanoma
  - ✦ Different shape, size, color
  - ✦ Random distribution

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## Globules



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## Dermoscopic Structures

### ■ Streaks

- ◆ Radially arranged, linear projections of dark pigment at periphery of lesion
- ◆ Emanate from tumor and radiate towards normal skin
- ◆ Brown to black
- ◆ Spitz Nevus
  - ◆ Arranged circumferentially around the entire perimeter of the lesion
- ◆ Melanoma
  - ◆ Located focally at the perimeter

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### Pigmented lesion with radial streaming and regression



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## Spitz Nevus



Copyright © Dr Eric Ehrsam, dermatologist

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## Dermoscopic Structures

- Negative pigment network
  - Serpiginous interconnecting hypopigmented lines that surround irregularly shaped brown structures
  - Resemble elongated and curvilinear globular structures
- saudades
- May be seen in congenital nevi
- Most likely associated with Spitz nevi and Melanoma

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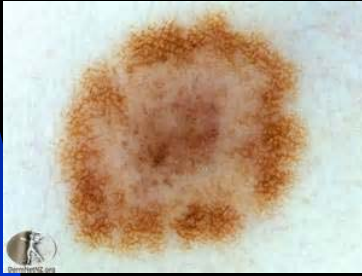
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## negative pigment network



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## Atypical Pigment Network



© DS Medica S.r.l.

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## Dermoscopic Structures

- Chrysalis/crystalline
  - ◆ White shiny linear streaks
  - ◆ Seen only with polarized dermoscopy
  - ◆ Oriented parallel and sometimes perpendicular to each other
- Scars
- Dermatofibromas
- BCC
- Lichen-planus like keratosis
- Melanomas
- Spitz nevi

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## Chrysalis/crystalline



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## Crysalis structures



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## Dermatofibroma



Source: Dermnetnz.org

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## Dermoscopic Structures

- Regression structures
  - ◆ Blue-White Veil over **flat/macular** areas
    - ✦ White scar-like depigmentation
    - ✦ Often combined with or adjacent to blue-gray areas or peppering
    - ✦ Lighter than surrounding skin
    - ✦ Appears shiny white w/ polarized dermoscopy
  - ◆ Melanoma
  - ◆ Less commonly, nevi and lichen-planus like keratosis

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## Blue Gray Veil Melanoma



Source: dermoscopy.wordpress.com

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## Blue Gray Veil



© www.dermoscopy.org

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## Dermoscopic Structures

- Regression Structures
  - ◆ Blue-White Veil over palpable/raised areas
  - ◆ Irregular, confluent blue pigmentation
  - ◆ Overlying white "ground glass" haze
- ◆ Nevus
  - ✦ Homogenous
  - ✦ White hue
  - ✦ Located in center of lesion
- ◆ Melanoma
  - ✦ Heterogeneous
  - ✦ Prominent
  - ✦ Asymmetrical

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## Blue Gray Veil, Irregular Globules, Pseudolacunae



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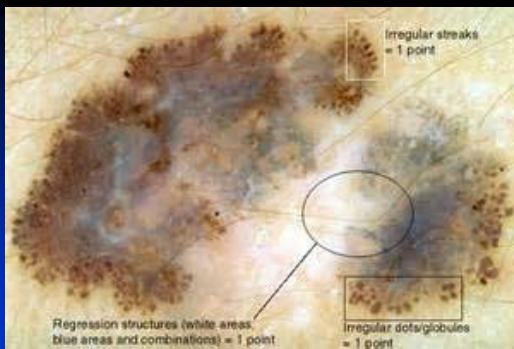
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## Blue Nevus



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## Dermoscopic Structures

- Vascular Structures
  - ◆ Pink hue (milky red areas)
  - ◆ Isolated blood vessels with varying morphologies

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- The vascular pattern may be quite distinctive and allow diagnosis of a pink skin lesion, in the absence of pigmentation or dermoscopic structures.
- If using a contact dermoscope, take care not to press down on pink lesions, which will exsanguinate the vessels and make diagnosis more difficult.

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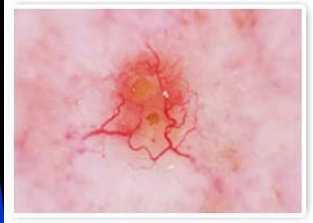
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## Arborizing Vessels



Source: [www.melanomaclinic.com.au](http://www.melanomaclinic.com.au)

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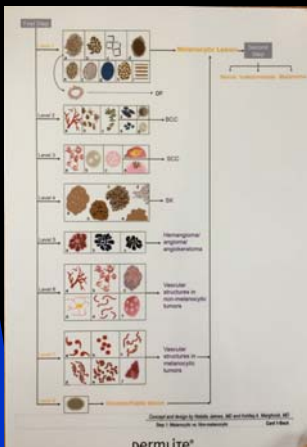
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## Vessel Morphology

Amelanocytic Melanoma	Dotted or atypical or corkscrew or pink bluish or polymorphic vessels
Benign Melanocytic Nevus	Comma-shaped vessels
SK	Hairpin vessels, with white halo
BCC	Irreg. arborizing vessels
SCC in situ	Focal grouped glomerular vessels
Hemangiomas	Uniform red, blue or purple vessels
Telangiectasias	Dilated linear & branched vessels
Hemorrhage	Red-blue lacunes w/n tumor
Psoriasis	Uniform globular vessels

Adapted from [dermnetz.org](http://dermnetz.org)

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Deb's notes to self:

Polymorphic vessels = BAD

Vessels as dots = SCC

Glomerular vessels and scale = SCC

If you see PINK, stop and think

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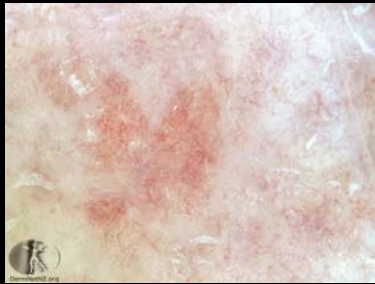
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Focal Glomerular Vessels  
SCC in situ



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Pink Blush Amelanocytic Melanoma



Source: DermnetNZ.org

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## Telangiectasias



Source: DermnetNZ.org

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## Dermoscopic Structures

- Milia – Like Cysts
  - ◆ Round whitish or yellowish structures
  - ◆ Shine brightly under nonpolarized dermoscopy

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## Seborrheic Keratosis



Source: www.dermoscopy.org

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## Dermoscopic Structures

- Comedo-like openings
  - ◆ Blackhead-like plugs on surface of lesion
  - ◆ Usually associated with SK's

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## Dermoscopic Structures

- Ridges and fissures
  - ◆ Cerebriform surface
    - ★ Gyri (ridges)
    - ★ Sulci (fissures)
  - ◆ Associated with SK's

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## SK fissure-like



Source: dermatnetnz.org

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## Dermoscopic Structures

- Fingerprint – like structures
  - ◆ Thin light brown lines that do not interconnect to form a meshwork pattern
  - ◆ Feature of lentigo or early SK

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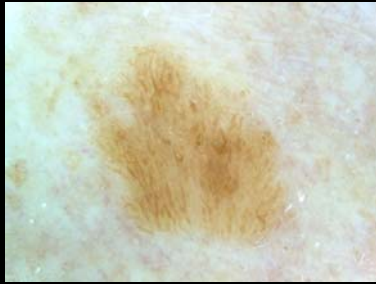
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## SK fingerprints



Source: dermnetnz.org

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## SK fat fingers



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## Dermoscopic Structure

- Moth – eaten border
  - ◆ Concave invaginations of lesion border
  - ◆ Associated with solar lentigo

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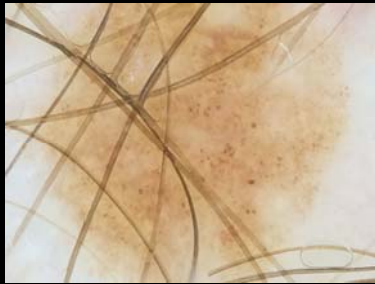
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## Solar Lentigo



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## Solar Lentigo



Source: dermnetnz.org

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## Congenital Nevus

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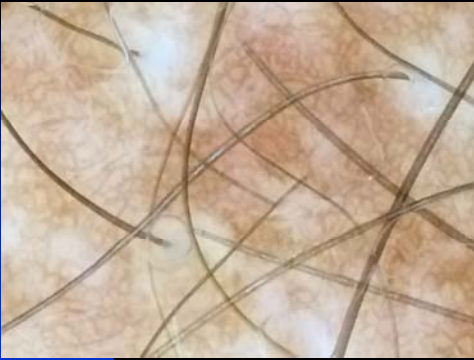
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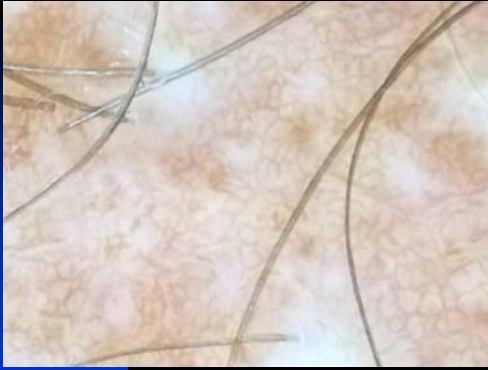
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## Dermoscopic Structures

- Leaf – like areas
  - ◆ Brown to gray-blue discrete bulbous structures
  - ◆ Create shapes that resemble leaves
  - ◆ Highly specific for BCC

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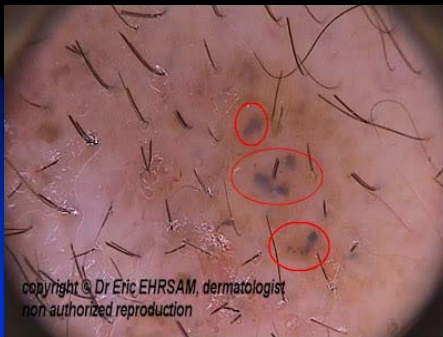
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## Dermoscopic Structures

- Spoke – wheel – like structures
  - ◆ Well circumscribed brown to gray-blue-brown radial projections meeting at a darker brown central hub
  - ◆ Highly specific for BCC

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## BCC look alike



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## Dermoscopic Structures

- Large blue-gray ovoid nests
  - ◆ Large, well circumscribed areas
  - ◆ Larger than globules
  - ◆ In the absence of a network, these structures are highly specific for BCC

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## Large Blue Gray Ovoid Nests



Source: dermnetnz.org

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## Large Blue Gray Ovoid Nests



Source: dermnetnz.org

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## Dermoscopic Structures

- Multiple blue-gray non-aggregated globules
  - ◆ Round
  - ◆ Well-circumscribed structures
  - ◆ Resemble small ovoid nests
- In absence of a pigment network, suggests BCC

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## Multiple Blue Gray Non Aggregated Globules



Source: DermNet NZ

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## Dermoscopic Structures

- Lacunae
  - ◆ Red, maroon, or black lagoons
  - ◆ Seen in angiomas and angiokeratomas

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## Hemangioma



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## Dermoscopy Structures

- Rosettes
  - ◆ White 4 leafed clover-shaped structures
  - ◆ Only w/ polarized light dermoscopy
- Suspect SCC

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## SCC w/ rosettes



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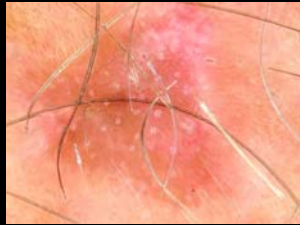
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## SCC in situ Rosettes



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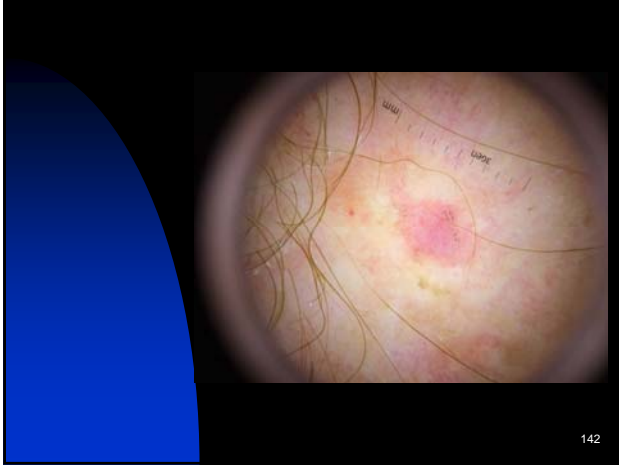
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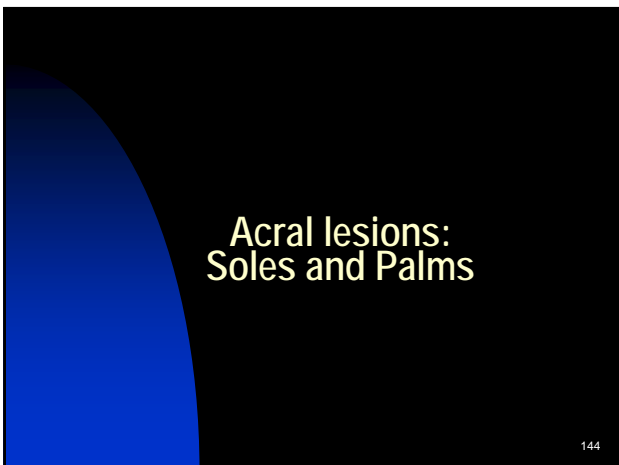
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## Lattice Pattern



Source: Dermnetnz.org

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## Lattice pattern



Source: Dermnetnz.org

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## Parallel Furrow Pattern



Source: Dermnetnz.org

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## Fibrillar Pattern



Source: Dermnetnz.org

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## Fibrillar pattern



Source: Dermnetnz.org

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## Fibrillar pattern dysplastic nevus sole



Source: Dermnetnz.org

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## Mixed pattern



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## Parallel ridge pattern melanoma



Source: Dermnetnz.org

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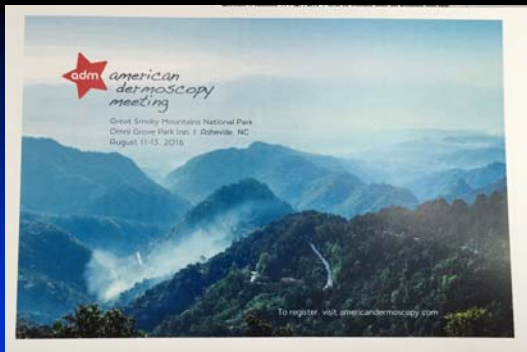
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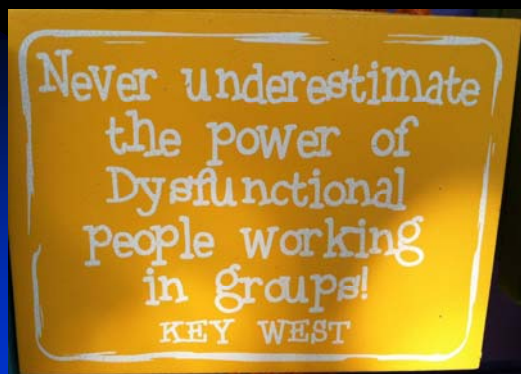
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